

The University of Chicago

THE CHRONOLOGY OF GREEK WALLS

A PART OF A DISSERTATION SUBMITTED
TO THE FACULTY OF THE DIVISION OF
THE HUMANITIES IN CANDIDACY FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ART

1939

By

ROBERT LORENTZ SCRANTON

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PREFATORY NOTE

The complete dissertation, of which the present publication constitutes the "essential portion," has recently been published by the Harvard University Press for the American School of Classical Studies at Athens, with aid from the American Council of Learned Societies. The book is entitled Greek Walls.

R. L. S.

July, 1941



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INTRODUCTION

The following is a portion of my doctoral dissertation, "The Chronology of Greek Walls." The plan of the dissertation was to suggest a classification of the styles of Greek masonry as used in fortifications, terrace walls, and the like; to assemble as many examples of these types as possible, together with evidence bearing on the dates of the examples; and to form some general conclusions as to the chronology of the styles. In the following presentation is included an abstract from the introduction to the dissertation, giving the classification of the styles of masonry; Chapter I of the dissertation, which contains the complete discussion of one of the four major divisions of the styles including the lists of examples; and a brief summary of the general conclusions as to the chronology of the other styles. The abstracted chapter constitutes a demonstration of the methods adopted in attacking the whole problem. The same method was used throughout in the study of the other styles, although the problems connected with these other types are considerably more complicated than those covered in the study of the first group.

Classification and Terminology

A few remarks are necessary on the subject of the classification, and on the nomenclature used. There are walls so crude in construction as to be useless in a stylistic study, but in dating it must be an axiom that, as in all other things, masonry must show enough results of workmanship to reflect the intention of the artisan. In other words, a rough, unshaped block can have no demonstrable character which will prove that it was put beside another block one thousand years before Christ or one thousand years after Christ. It is of such stuff that field walls and fences are made, as well as fortifications. It has been dismissed as useless to our purposes, and is characterized as "dry rubble." Although there occasionally occur walls of blocks which do seem to have been worked to some extent, but which are poorly set with no good joints, these also have been

consigned to the dry rubble group. In other words, generally speaking, the only walls which can be considered are those of worked blocks well jointed. Exceptions will be made to this rule when it can be seen that the builders, although hurried, impoverished, or unskillful, have been acquainted with the current styles, and reflect the influence of them in their work.

A block, then, in order to be of any significance, must have been shaped. That part of the shape which was concealed can be of no significance to the appearance, therefore all references to shape must be to the visible, vertical surface which constitutes the front of the block. Now although there are triangular, or trilateral blocks in Greek walls, they are always used with blocks of other shapes, so that the most convenient way of making the first division is to consider blocks to be either quadrilateral or multilateral in shape. Quadrilateral blocks can be either rectangular or "ashlar," with the opposite sides parallel, or "trapezoidal," with only two opposite sides parallel, and these almost invariably the horizontal sides. Quadrilateral blocks are conceivable of such a shape that no two sides are parallel, but such do not figure in Greek masonry to any appreciable, significant extent. Multilateral blocks can be "polygonal," with any number of straight sides meeting in sharply defined angles. They can, also, particularly in Greek masonry, have several curved sides (fig. 2). Such masonry has been called by many "Lesbian masonry."

Quadrilateral blocks, however, as opposed to multilateral blocks, can be most conveniently arranged in courses. Normally the coursing is such that each course is the same height as all the others. This is usually called "isodomic work."¹ Occasion-

¹A peculiar anomaly in the use of the terms "isodomic" and "pseudo-isodomic" has been pointed out to me by Professor Axel Boethius. They have long been used in Greek archaeology without comment; the first to refer to ashlar or trapezoidal masonry laid in courses of even heights; the second to refer to ashlar or trapezoidal masonry laid in courses of different heights, either alternating or irregularly varying. But, as Professor Boethius points out, Vitruvius (ii. 8. 5) specifically defines these words as applying not to ashlar masonry at all, but to the use of small stones laid as a facing for concrete. Vitruvius says that when the Greeks depart from ashlar work of dry masonry, and employ concrete (structura), they sometimes use small squared stones laid like brick, called isodomic work, or small stones laid in some other way not clearly explained, called pseudo-isodomic work.

ally the courses are of varying heights. To this the term "pseudo-isodomum work" will be applied. That term is sometimes restricted to masonry in which there are only two course heights which alternate. Walls of this description are comparatively few and it is more convenient to extend the term to cover all walls in which the courses are of varying heights. Occasion will be found later to stress again a point which should be made here, that intent to

These he gives as superior alternatives to the Roman opus incertum and opus reticulatum. Thus it is obvious that the ancients, or at least Vitruvius and his circle, did not use the term as we do. Although there is no reason for us to abandon our usage which has the sanction of long habit in modern scholarship, we may yet take occasion to call attention to this.

It is at the same time interesting to note that to my knowledge no Greek masonry of the types Vitruvius describes is preserved to us. We know that the Greeks used cement and concrete in water works at an early date. We may cite the early Hellenistic concrete vault over upper Peirene at Corinth (Stillwell, Defenses of Acrocorinth, Corinth, III, 1 (1930), p. 42). A brief series (however unsatisfactory) of monuments exemplifying the Greeks' use of cement in stone work has been assembled by Delbrück (Hellenistische Bauten in Latium, Vol. II (1912), p. 87). But in the second century, Philo of Byzantium (Mech. Synt., v. 1 ff.) although recommending laying stones in lime for towers and battery emplacements, is apparently oblivious of concrete. But in any case, whatever the Greeks of Classic or Hellenistic times may have known about concrete or cement, we have apparently no evidence to show that they used it in any way resembling the Roman structura, with facings of small stones.

It is, of course, possible that research in Greece may bring to light Greek walls of Vitruvian structura with opus isodomum or opus pseudo-isodomum. For the time being, however, we may suggest that Vitruvius is referring to purely contemporary conditions, those of the second half of the first century B.C. If so, the Greek structura to which he refers will have been used only in what we would now call "Roman walls" in Greece of the late Hellenistic East, and such wall has so far escaped analysis. It is indeed possible that the technique which Vitruvius describes was invented and perfected by architects of Greek nationality working exclusively with the Romans; in other words, among the Roman architects of that period there may have been the Roman or traditional, native school, represented in Vitruvius by the opus incertum and opus reticulatum, and the Greek school, represented in Vitruvius by the opus isodomum and the opus pseudo-isodomum. If this be true, we may perhaps see opus isodomum at least in the Augustan fortifications of northern Italy, where the concrete core is protected by a facing of small squared stones which do perfectly resemble brick-work. These may have been built by an architect of Greek name and ancestry, working with the Roman legions and employing a technique used by his fellows also working for the army. Opus pseudo-isodomum has not yet been identified even so tentatively.

vary the course heights must be proved; a measuring stick is valueless, for the only pertinent intent to vary the course height must be so that it can be seen. If the variation is not obvious to the observer, it is without significance in the system which is being developed. In ashlar masonry, usually in isodomic, but occasionally in pseudo-isodomic work as well, we find some examples of walls in which various rhythmic systems of headers and stretchers have been worked out, producing more or less striking patterns. This "header and stretcher" technique will also be found of value in working out the chronology. It should also be noted that polygonal blocks are sometimes modified to the extent that they are substantially quadrilaterals, and are arranged in courses in "coursed polygonal." Finally, even quadrilateral blocks are often laid without regard to courses, with blocks of all sizes fitted neatly together. Such uncoursed quadrilateral work will be called "irregular" trapezoidal or ashlar work.

Attention next turns to the dressing, or finish, given to the face of each individual block. Before naming the terms which will be employed, it is advisable to speak of the nomenclature in general, for in my opinion, this single problem has been one of the chief causes in the delay of a proper understanding of the styles of Greek masonry. In a review of The Defenses of Acrocorinth and the Lower Town,¹ Mr. Carpenter is criticized for a certain confusion in the terminology with which he describes the masonry of Acrocorinth. Yet the reviewer is hardly more fortunate in his rather dogmatic alternative suggestions. The fact is, however, as the reviewer says, that until those who are interested in the subject come to a common ground on the matter of terminology, further progress is impossible.

The problem of terminology is, of course, a difficult one. Past usage has brought certain terms into general employment; terms which, however, are not rationally inter-related. A nomenclature to be useful should be simple, logical, and self-explanatory. The words should, moreover, be easy to say and not so harsh as to mar the quality of style of which some writers are capable. The term "trapezoidal," for example, is perhaps simple and comprehensible, but it has no logical place beside "ashlar" and "Les-

¹JHS, LVIII (1937), p. 36.

bian," although it has with "polygonal." To be perfectly logical one should speak of "curvilinear," "polygonal," "trapezoidal" and "rectangular," which would make discussion labored and stiff. The alternative would be to dispense with all those words and find others. But with "polygonal" and "ashlar" so well established, and "Lesbian" already widely used, this is impossible, and a better word for "trapezoidal" has escaped my notice. Some more or less widely used terms must be abandoned because they have widely different meanings to different people, and their retention would lead only to confusion. Of these the most striking example is "rusticated work," used synonymously with "bull-nosed work." Both of these terms have been used variously for blocks with more or less roughened faces, with or without drafted margins, and even for rather smoothly faced blocks with chisel drafted margins. It has thus been my policy to accept words in common usage whenever they can be defined to apply to a specific style. In other cases, words have been invented like "trapezoidal" (which does have a circulation, however limited) or borrowed and somewhat modified, as some of the terms which are used for the surface treatment of the blocks.

These terms have been based on those defined in the Encyclopedia Britannica,¹ under the article "Masonry." The term "quarry face" has been retained to refer to blocks whose faces have received no substantial working beyond that resulting from their removal from the quarry (fig. 1). "Hammer face," or "hammer work," is used for blocks which have been consciously roughened. The distinction between these two varieties of Greek masonry is difficult, and has not been pressed. It is usually only in the case of blocks of soft stone that the difference can be proved, for in general the Greek limestone of the harder varieties breaks out of the quarry with a definitely rough surface. "Broached work" is that in which the quarry face has been modified by cutting with the pointed chisel long grooves, usually slanting downward across the face of the block. These grooves are usually arranged in two or sometimes three tiers; occasionally only one. The distinction has not been found of value, for the number of examples is limited and the occasions when extremely accurate dating can be given are even fewer. "Pointed work" is that in

¹Edd. XI and XIV.

which the surface has been brought to a flat surface, not smooth, and three to five (or six, if the block is very high) tiers of grooves have been cut vertically or sometimes slanting down the face of the block. A refinement or elaboration of this is "furrowed work," in which the entire surface of the block is covered with short grooves so close together and so numerous that the arrangement in tiers, which exists, is not striking. Furrowed work is done more cheaply in soft stones by the use of the toothed chisel, consisting of a broad chisel with many teeth, a single stroke of which produces a row of five or six grooves. This is called "toothed-chisel work." The above terms are apparently in common usage among modern masons, in senses which approximate those with which they are here supplied. A final term is needed for Greek masonry, which requires a certain modification of the modern word. There are numerous examples of blocks of which the face has been brought to a flat plane. It is practically smooth, without being polished. This result was achieved by the ancient Greeks in different ways, according to the stone: soft stone was dressed flat with a broad flat chisel; hard stone, with minute application of bush hammers (or boucharde). Often an essentially flat or smooth surface was made by the broader use of the pointed or flat chisel, aided by the natural tendency of the stone to cleave or spall. Without regard to the means by which this near-smooth surface was made, it will be convenient to refer to that surface as "tooled work."

Finally we shall find that valuable distinctions can be made on the basis of the treatment of the margins; there are two of these, apart from the simple, flush joint. The first is the drafted joint, in which a band usually from two to six centimetres in width is dressed in the surface of the stone along the joint. The drafting may be found on the lower edge, on the lower edge and one or two sides, or on all four sides. The drafting occurs with several types of surface dressing, and, theoretically, with all. The same remarks apply to the "beveled joint," in which the edge has been chamfered at an angle of approximately forty-five degrees to the face, in a tooled band some two to six centimetres in width. Rarely the joints were both beveled and drafted. The bevel in question must not be confused with the slighter bevel which in the best masonry sometimes extends some three or four centimetres inward along the joint surface, and results in a crevice of a centi-

metre or less along the joint. This was purely a constructional device, intended to prevent the corners from chipping in setting. It is almost invisible without close examination, and served no decorative purpose.

Below is the classification of styles, presented schematically. It will be understood that theoretically all of the surface treatments can be found in all of the shape and coursing groups, and both of the joint treatments can be found on all of the face types. Practically, of course, this is not true.

Schematic Classification of the
Styles of Greek Masonry

According to the Shape of the Blocks and Coursing

- I. Multilateral
 - A. Lesbian
 - B. Polygonal
 - 1. Regular Polygonal
 - 2. Coursed Polygonal
- II. Quadrilateral
 - A. Trapezoidal
 - 1. Irregular
 - 2. Isodomic
 - 3. Pseudo-Isodomic
 - B. Ashlar
 - 1. Irregular
 - 2. Isodomic
 - 3. Pseudo-Isodomic
 - 4. Headers and Stretchers

According to the Treatment of the Faces

- a) Quarry faced
- b) Hammer work
- c) Broached work
- d) Pointed work
- e) Furrowed work
- f) Toothed-chisel work
- g) Tooled work

According to the Treatment of the Joints

- 1) Drafted
- 2) Beveled

CHAPTER I

LESBIAN MASONRY

The Style

Throughout the provinces of the Aegean Sea there once flourished a style of masonry so curiously intricate, so highly sophisticated, that no other time or place has equalled it in elaboration of technical perfection. By no means confined to purely monumental architecture, it has indeed only one occurrence in temple architecture, and was employed as extravagantly for the utilitarian purposes of fortifications as for the more purposely decorative retaining walls in sacred precincts. It is most easily identified, for variations are extraordinarily few and simple. The primary characteristic is unmistakable: the joints are curved. In the most familiar examples, as the lower terrace for the temple at Delphi, there are indeed few joints which are not curved (p. 24, A 2, 7). Occasionally, even in so highly developed an example, there are straight lines here and there, but all the sides of a great majority of these blocks are curved to a greater or less degree.¹ The surface treatments of the blocks are limited to three, which are usually qualitative or expedient versions of one. Characteristically the surface is tooled. Very often pointed work is employed, but the pointing is so fine that the effect is essentially the same. As it seems so intended, no distinction is made here.² Infrequently, when the rock is such that it splits readily and evenly, the quarry surface is left (fig. 1).

The appropriateness of the name which was long before given to the style by such a man as Noack can not have been fully

¹It is improper to speak of this style as polygonal. In the ordinary sense of the word, a polygon is taken to mean a plane figure with more than four angles, and it is usually accepted that the sides are all straight. In technical mathematics, other plane figures can be termed polygons.

²Indeed, it is often impossible to determine the original surface of blocks which have long been exposed to rain.

appreciated.¹ But in the list of examples it will be observed that there are almost no examples in regions out of Ionic influence. None is to be found in western Greece; none has come to my attention from Macedonia or Thrace. Only one good example is listed from the Peloponnesos - at Argos - and this can possibly be debated. On the other hand, the eastern shore of continental Greece from Attica to Thessaly, the islands of the Aegean, and the western shores of Asia Minor are plentifully supplied with relics of this phase of antiquity. Thus it is obvious that the style is, if not Lesbian specifically, at least Aegean and largely Ionic. Moreover, there is some reason to assign the development of the style, and hence the name, to the island of Lesbos itself. The earlier writers who employed the name derived it from a passage in Aristotle² in which he suggests that the education of the young should follow the principle of moulding the youth to a pattern appropriate to circumstances, as masons engaged in laying up stones according to Lesbian technique bend the strip of lead to the pattern of the blocks. The explanation is that in building polygonal walls the masons had strips of lead at hand, with which they made templates of the sides of each block when it had been set, so as to mark on the adjoining blocks the lines on which they should be cut to fit properly. As such a device would be unnecessary in ashlar, or even in trapezoidal masonry, it was supposed to have been used for polygonal work. And since the Ionic and Aeolic associations of Lesbos make the term harmonious with the sinuous lines of the masonry under discussion, the name found ready appliance.³

¹Forchhammer, in his book Über die Kyklopischen Mauern Griechenlands und die Schleswig-Holsteinische Felsmauern (Keil, 1847), pp. 5 f., was apparently the first to elucidate the term, applying it to all polygonal and even Cyclopean masonry.

²Nic. Eth., v. 10. 7 (Loeb).

³The burden of the argument to follow will be to the effect that Lesbian masonry is all of pre-Persian date. The criticism thereupon arises that Aristotle could not have been referring to this type of masonry, which had ceased to be used more than a century before his time. It is probable, however, that the device of the lead strip had been originally developed by builders in the curvilinear style, and continued in use for polygonal masonry even in its archaistic phases and perhaps also trapezoidal work, down to the time of Aristotle and longer, retaining its ancient name.

It is perhaps unfortunate for this suggestion that no really fine examples of "Lesbian masonry" have been found on the island of Lesbos, to my knowledge. At Xerokastro, near the centre of the island, there is a fortress in this style, however roughly finished (fig. 1). This must be considered to fall fairly late in the history of the style, for the corners are well drafted, a fact which should indicate that the construction occurred well on toward the middle of the fifth century. If, on the other hand, this is a late survival of the technique in question, that circumstance alone might be an indication of its popularity in Lesbos, for that people should have continued to build rough walls of this type when other styles predominated elsewhere would indicate that some particular value was attached to it. The mere fact that few examples can be cited from the island is of no significance in itself, for there are few places in Greece where ancient fortifications have suffered so violently. But there is, finally, one fact which, if not conclusive, will yet go far to confirm the association of the phrase "Lesbian style" with the type of masonry characterized by curvilinear joints.

This fact is to be observed at the modern village of Eresos, which is located by the site of an ancient town bearing the same name in antiquity - one of the reputed homes of Sappho. Along the eastern end of the modern fishing port of the village there rises a steep and rocky hill commanding a romantic view of the sea to the south and west. Rocky ledges leading from the foot of this hill form a rudimentary harbor, now abandoned in favor of the sandy beach in front of the modern village, but anciently elaborated with masonry moles of which remains still exist. On the seaward slopes of the hill, overlooking the harbor, are remains, generally insignificant, of ancient habitation and building, mostly in the form of water channels, cisterns, and terraces. The latter are largely demolished, and the blocks which have fallen from these buildings and terrace walls down the steep slope must account for the present shallowness and danger of the ancient harbor. But one of these terraces, only a few feet from the edge of the expanding modern village is partially preserved and may have in the present discussion a most vital significance. As preserved it consists only of a few stones arranged in a line only a course high. The surfaces of the blocks retain the quarry face, slightly modified by a broad, sweeping, rather careless use of the pointed chisel.

The joint surfaces have no signs of working whatsoever. The wall was evidently built of free-lying boulders or chunks of stone pried out of the rock without cutting, and split in halves. The joints are irregular and gaping - the blocks were never fitted together. And yet, each individual block is a splendid example of the curvilinear style (fig. 4). An examination of the rock structure gives a ready explanation. The blocks of the wall, evidently from the native rock of the hillside, are of a metamorphosed igneous material, apparently a slightly schistose diabase or gabbro. A small amount of iron in the rock has formed in concretionary bands throughout the mother rock, in such a way as to produce lines of division on which irregularly curved weaknesses have developed. On these lines boulders have split naturally out of the hillside, irregularly but smoothly rounded. Such a boulder, if broken evenly in two, produces two blocks whose edges are generously curved. The similarity of the resultant shapes with the normal blocks according to the curvilinear technique is so striking as to suggest that the forms produced accidentally by those engaged in building rough house or terrace walls of such material may have inspired them to copy the forms artificially, by cutting, in more monumental building. Although this geological formation is most evident at Eresos, the entire island of Lesbos is made of the same or related rock, so that it seems not at all impossible that the curvilinear technique actually developed in the island from an observation and modification of natural forms, and thence, spreading over the Aegean territory because of its decorative possibilities, was given a name harking back to its place of origin.

From a description of what is the most easily identifiable of all the styles, it is necessary now to turn to one of the more nearly subjective phases of the system. Certain as may be the identification of a well-built wall in the Lesbian style, there are gradations of quality through which it is possible to determine the technique, but with diminishing confidence. The point is eventually reached when the masonry is obviously of the dry rubble type, but the line of division between this and the equally obvious rough Lesbian must be a matter of opinion. Examples of excellent masonry of the Lesbian style are to be found in the appended list, the blocks having the quarry face. The difference between the walls at Larisa (p. 23, A 1, 8; p. 25, A 2, 17), for example, and the wall at Xerokastro (p. 23, A 1, 12), is quite

obvious. The last is almost crudely built, with the joints sometimes quite open. The surfaces are evidently quarry faced, but even the more rough protrusions have not been removed, as was commonly done in that finish; and yet the joint surfaces are obviously curved, and occasional bits where the workmanship is more careful are almost as good as those of the first-named examples. The difference, again, between the wall at Xerokastro and the earliest wall at Abai (p. 26, A 4, 1) is not so great, although there is a far cry indeed from the careful jointing at Larisa and the chinking at Abai. The wall at Abai to which reference is being made here is not the fine tooled Lesbian wall which comprises the greater part of the early circuit, but the cruder masonry which appears occasionally under the good Lesbian wall, especially near the gate, and elsewhere alone (fig. 3). The illustration shows how the scheme of jointing is laid out on curvilinear principles, but the construction is so inferior that blocks of all shapes and sizes were used for chinking the more difficult corners. This lowest wall of Abai might indeed escape comment completely were it not well preserved by the later Lesbian structure. And yet, in its existing associations, with walls like that of Xerokastro for comparison, it can scarcely be doubted that one is entitled to look for Lesbian influence in walls whose construction from reasons either of poverty, inexpertness, or type of material, finds no place among the typical examples of the style.

An example of the application of this criterion may be derived from a comparison of the walls of Samothrace (p. 27, A 4, 11) and of Corinth. The latter¹ were built of unworked blocks of limestone. No careful joints were cut; the irregular blocks were laid up rubble-fashion with small stones to chink the holes. At Samothrace there are three periods of wall construction, of which the first two are of present significance. The earlier is to be found on the acropolis and all along the side facing the interior of the island. In the upper reaches it is built of a massive basaltic rock, in the lower reaches of a fine porphyritic granite. Here the blocks of both materials are only roughly shaped, with some chinking, but in the general shape the blocks are rounded.²

¹Carpenter, The Fortifications of Acrocorinth (Cambridge, 1936), figs. 25-26.

²Conze, Untersuchungen auf Samothrake (Vienna, 1875), I, pls. 5, 6, 7; II, pl. 69.

The second period is to be found in a repair of the gateway toward the interior of the island, and on the west side. Here the blocks are all granite, well cut and fairly jointed, but they have no suggestion of curvilinear shape. The wall is obviously built in the polygonal style.¹ It cannot be argued that the differences of style are due to differences of material, because both types appear in granite. In Conze's Vol. II, plate 69, is illustrated a corner in the wall at a point where the material is granite, and where the construction shows the Lesbian influence. The finish of the corner is remarkable in Greek wall construction; the corner blocks are extraordinarily long, - one is almost two metres in length - and are laid with the ends projecting in criss-cross fashion, like logs. This type of corner is not found in the basaltic section, for that stone is most conveniently handled in chunky pieces. In the granitic sections of polygonal, the corners are well finished with closely fitting blocks in polygonal style. Thus, although neither the granite nor the basalt rubble wall at Samothrace falls clearly into company with Lesbian or polygonal masonry, it will be evident that the Corinthian example is purely dry rubble in its illustrated examples, and the earlier Samothracian example of basalt and granite is dry rubble with an influence from Lesbian.

Historical Considerations

For the dating of the Lesbian style the evidence is coherent and decisive, if not so precise as might be desired. Fifteen examples, most of them in Athens, Eleusis and Delphi, are securely dated in the sixth century, and about half of the others can be similarly dated on grounds of historical probability. With but a single exception, no wall of this style has been dated correctly or convincingly after the period of the Persian wars. The exception is obviously archaistic and takes its place beside such works as the excellent wall of Lesbian masonry in the gardens of Sans Souci. The Greek wall in question is the grave of Antidoros, in the Kerameikos (p. 25, A 3, 1). Here the joints are extravagantly curved in the best Lesbian manner; the surfaces are tooled in a manner theoretically indistinguishable from normal archaic walls. The joint edges, however, have been emphasized with a dis-

¹Ibid., I, pl. 4

tinct bevel - a device which is conspicuously absent in archaic Lesbian masonry, but which was employed widely for all styles used in the Hellenistic period from which this monument actually dates. Although attempts have been made to put other examples of the style in later periods (e.g. the lower terrace at Delphi, in unpublished arguments), the reasons have never been cogent.

In general it may be said that wherever Lesbian masonry occurs in fortifications which include other styles as repairs or rebuildings, the Lesbian is always the earliest of the series, when the series can be established. A second generalization may be made to the effect that Lesbian masonry is never found at a site which lacks an archaic history. (This is not to say that every site with an archaic history will have had Lesbian masonry, but that is of no significance. For example, many sites in the Peloponnesos had their time of glory in the pre-Persian periods, but none has been found where there is preserved a good example of the Lesbian style.)

Argos.-- At Argos, the earliest wall on the Larissa after the Mycenaean period is constructed of well-fitted, smoothed blocks of limestone which do not fall readily into any classification of the present system. The blocks are almost all four-sided trapezia, no two sides of which are parallel. Such shapes of blocks occur, of course, but not in well fitted masonry. A few, but only a few curved joints may be seen. It is probably to be supposed that the Argive builders had seen Lesbian masonry, but had had no experience in its use, so that they were able to employ it only according to the accidents of construction. No other wall of the Peloponnesos which for other reasons can be dated in the archaic period shows even so much influence from northern or eastern Greece.

Delphi and Eleusis.-- It is at Delphi and Eleusis that the chronology of the style is best attested. The work on Eleusis has been well done by Noack and later by Kourouniotes, and is most conveniently summed up by Wrede. A perusal of the last named scholar's book¹ will reveal at once that as early as the time of Solon the style was well under the control of masons, and chosen for important work. Even the first archaic terrace (p. 26, A 4,

¹ Attische Mauern (Athens, 1933).

5), dated in the seventh century, shows the influence of the style, and the wall of the oldest telesterion (p. 24, A 2, 12) from the seventh century indicates that the masons were adept at their art. The sixth century terraces represent a high point in the development. By the time of the Peisistratids the style at Eleusis at least seems to have been almost in a decline. There are represented three styles of surface treatment (p. 23, A 1, 5; p. 25, A 2, 14). But it is obvious that in one section¹ a tendency towards horizontal courses had begun, and in many stretches of wall the curvilinear technique appears only in the corners or in small insertions. The gate wall is almost ashlar masonry, but here, as at Argos, the blocks are not strictly rectangular, and there are frequent suggestions of curvilinear jointing. The versatility of the use of the style in Athens, where, during the same period, even cisterns and water channels were so constructed, can be seen by perusing Wrede's book.

Delphi would be as significant for the present study were the almost innumerable examples of Lesbian masonry to be found there completely published. Under existing conditions it is necessary to examine the place at first hand in order to determine the full significance of the material to be found. In the Marmaria the earlier polygonal precinct has only the influence of the style, being otherwise rather crude and near to rubble. The later wall, dated between 520 and 505 B.C.,² because of its relation to the second poros temple, is a good example of Lesbian polygonal technique, with slightly tooled face. In the upper precinct, what is probably the oldest peribolos wall on the northern side of the sacred way (p. 26, A 4, 3) is only rubble with Lesbian influence. Whether the Lesbian wall (p. 24, A 2, 8) in front of the Treasury of the Siphnians is part of the peribolos or not,³ it is agreed to be of early archaic date; and in any case, there are parts of the present encircling wall which are Lesbian in style (p. 24, A 2,

¹Wrede, pl. 13.

²T. Homolle and F. Courby, Fouilles de Delphes, II (Paris, 1915).

³Dinsmoor, BCH, XXXVI (1912), p. 451; Pomtow, Pauly-Wissowa, Supplement IV (1924), p. 1256.

9), and must be earlier than the Siphnian Treasury of 525 B.C. for topographical reasons.¹ In addition, there are the great upper terrace (p. 24, A 2, 6), behind the Ischegaon, and the lower terrace (p. 24, A 2, 7), which is now one of the finest remains on the site. The latter is sometimes said to be Hellenistic, apparently on the basis of the late inscriptions cut on it, but there can be no doubt as to its archaic date.² The precinct possesses many other examples of walls of this style, none of which should be dated later than the Persian wars.

Thasos.-- Apart from these sites there are few where accurate evidence for the date of Lesbian masonry has been obtained. At the city of Thasos there is a stretch of the city wall on the high ridge above the theatre (p. 25, A 2, 22). It has been built over and repaired by an irregular ashlar wall which elsewhere in the circuit can be observed to be earlier than all of the other periods, and to date in the early fifth century. Thus the Lesbian masonry is the first of the entire series. For the history we have a reference of Herodotus³ to the effect that the city was besieged by Histiaeus of Miletos in 494 B.C. In 492/1 B.C., the Thasians were engaged in building a wall, for we are told⁴ that Darius issued an ultimatum to the people to destroy the wall which they were building. That they obeyed the command is also reported by Herodotus.⁵ From these references it is obvious that Thasos was protected by a wall at the end of the sixth century and at the beginning of the fifth century B.C. Before these defenses Histiaeus encamped his besieging troops. During the course of the siege weakness must have developed in the wall, requiring repairs, to which were perhaps coupled extensions to the circuit. It was this reconstruction which was cut short by the demand of Darius. Now as can be demonstrated, the second period is the one to be connected with the restoration after Histiaeus; therefore the Lesbian polygonal circuit was the one which confronted the Milesians. That it had been built a fairly long time before is to be assumed

¹Dinsmoor, loc. cit., pp. 457, 491 f.

²Courby, Fouilles, II, 2 (1921), pp. 156 ff., especially 166; Haussoullier, BCH, V (1881), pp. 7 f.; Pomtow, Pauly-Wissowa, Supplement IV, p. 1299.

³Herodotus, vi. 28.

⁴Herodotus, vi. 46.

⁵Herodotus, vi. 47.

from the long stretches which now exist of the wall of 492 B.C. Had the archaic wall been new and in good condition at the opening of the fifth century, it is not likely that it would have been necessary to rebuild to extensively. Thus we may date the Lesbian masonry in the circuit wall of Thasos at least as early as the middle of the sixth century B.C.

Abai.-- Abai in Phokis has been mentioned before as possessing examples of both the finished style (p. 24, A 2, 1) and its influence in rubble work (p. 26, A 4, 1). It must be admitted, however, that there exists some doubt as to the relative chronology of the two. Immediately to the west of the principal gateway the finished Lesbian rests on a substructure of the cruder work. Elsewhere the two are to be found either alone or side by side in the stretches of the wall. Although some may prefer to believe that the masonry of the poorer quality was intended only as a foundation for the other, and was employed in less significant locations, this suggestion does not, in general, seem to satisfy the conditions of the topography, for the two types exist side by side on the most exposed slope. It seems much more probable that the cruder masonry is to be associated with the early archaic period of the place, which reaches back into mythological times.¹ It is known that the oracle of Apollo was consulted by Croesus,² so that the town had some importance in the high archaic period. That it should have collected enough income from its control over the oracle to repair its fortifications in the best contemporary style seems not at all unlikely. This wall was ruined by the Persians under Xerxes, and was replaced by a third circuit.

Eretria.-- In their present state the extensive fortifications of the acropolis at Eretria are of several periods, the finest of which are considerable remains of excellent polygonal masonry. There are, however, particularly on the northwestern side of the acropolis, well defined traces of what is apparently the earliest wall, below the line of the polygonal. In the earliest wall (p. 26, A 4, 7) the masonry is for the most part too poorly preserved to permit careful study. In general it seems to be a good quality of rubble. On the east side of the acropolis, again, there are distinct traces of it, especially near the great northeastern outwork, but here the stones barely show above the

¹Pausanias, x. 35. 1.

²Herodotus, i. 46.

ground. About midway down the southeastern slope, however, the line of the earliest wall approaches that of the later defenses, and here the construction of the polygonal periods and later are often seen to be built on top of or between stretches of a fairly well built wall with large blocks indifferently fitted and small stones used as chinking. Here there are occasional joints which seem to have a tendency toward curvilinear cutting. Although Pickard¹ argues that the wall in question and the great polygonal wall are contemporary and both pre-Persian, the present interpretation solves easily some problems which have given him considerable difficulty. Thus the "road" below his "tower g"² seems most probably to be a continuation of the earliest wall. The "double wall" consisting of the polygonal wall against which his "upper tower h" is built is certainly the post-Persian circuit, while the lower wall, on top of which the "lower tower h" is built is the ruined remains of the pre-Persian wall. Reasons for the dating of the polygonal wall in the fifth century can be shown, and the placing of the ruined first wall in the height of Eretrian prosperity we may find justified in the markedly wider extent of the area enclosed. If it is accepted that the polygonal wall is later than the other, it must also be accepted that its construction involved a diminution of the area to be defended. That a diminution should have taken place at the period of Eretria's greatest prosperity is a priori improbable, but can readily be explained as of a later date. The inferior quality of our earlier masonry is no criterion of its date, as has been seen already in the present work, and as Pickard himself admits. Archaic fortification walls of good quality are confined almost exclusively to our Lesbian technique; whenever the archaic builders did not use Lesbian work in their fortifications, even in powerful cities, they used rubble. This was so in archaic Corinth, as we have seen.

Epano Liosia.-- One of the most amazing and mysterious monuments of Greek antiquity stretches between the southern spurs of Parnes and the northern cliffs of Aigaleos (p. 26, A 4, 6). It is a wall separating the Thriasian plain of Eleusis from the valley in which lies Athens itself. So far no publication with

¹AJA, VII (1891), pp. 241 f., and pp. 381 f.

²Ibid., pl. 19; pp. 382 f.

any pretense to being adequate has appeared concerning it. With the exception of the map and comments in the Karten von Attika, two illustrations in Wrede's Attische Mauern,¹ and one or two sketches of which the best is in Leake's Demes of Attika,² references to it are confined to a series of comments, each one of which suggests a different date. The wall consists of a barrier more than four kilometres, or almost two and one half miles long. It is on the slope of the pass facing Eleusis, and is designed to prevent passage from that town towards Attica. Throughout the entire length there are no towers, but rather a series of offsets, producing an indented trace. In many of the indentations there are narrow, ingeniously contrived gates.³ Where the wall lies on a steep slope, it consists simply of a facing supporting a mass of broken stone in the form of a terrace. Elsewhere, on more gently sloping ground, it is built up of two faces, and strengthened from the rear by ramp-like buttresses. The masonry is scarcely better than dry rubble, but it may be said to show a certain amount of Lesbian influence. For this reason it has been included in this section of the present discussion.

There is no external evidence for the date of the wall. All agree in dissociating it from the immediate period of the Peloponnesian war, because of the well-known policy of Pericles in refusing to engage the Spartans in the open field. Wrede strangely argues that the wall cannot have been earlier than the Peloponnesian wars because if it had existed during that period there would have been battles connected with it. Skias⁴ would place it in the period of the Thirty, when they had fled to Eleusis, and the Athenians were defending Athens from them. Others like Wrede, have seen in the masonry a similarity to fourth century work, but on what critical principle it is difficult to ascertain.

But it must be taken into consideration that whenever the wall was built, it was a major undertaking. So long a wall, of

¹Pls 28-29.

²Topography of Athens, II (1841), p. 144.

³Ibid., p. 144

⁴Eph. (1919), p. 35.

such height that even now it is preserved in places to about three metres, is not the sort of work that is thrown up as a purely temporary thing. It is as ambitious a project in its way, as the Long Walls, particularly in that it is so far from the city. Even a study of the map will bring realization that it was intended to complete the wall of mountains with one of stone, and to isolate Attica from the land to the west. As such it must have been the result of a coherent public policy with a conception of the defenses of Athens such as is not to be found in the ancient writers.

From the sixth century on, Athens was not a city in Attica, but it included all of Attica, and its frontiers were far beyond the edges of the city plain. There is no question that historically the most probable and reasonable time for the construction of this wall is before the absorption of Eleusis by Athens,¹ and it is to this period that the stylistic criteria developed by the present study would lead. In the first place, there is the indented trace, which is used in such a way as to indicate that it was misunderstood by the architect, for the enfiling faces often face up hill instead of down, and are thus at a disadvantage. This suggests an early stage of development, which took place during the archaic period. Moreover, the tendency towards curvilinearity in the stone work suggests an association with our archaic Lesbian style.² The quality of the work is of course no criterion of relative date, but the several considerations taken together make a date as early as the seventh century B.C. imperative, even urging an earlier period. That the wall might even be as early as the eighth century is not only possible, but is even made probable by an added theoretical consideration. If Athens was able to absorb Eleusis before the time of Solon, a considerable period must have elapsed during which Athens was gaining strength in relation to Eleusis. Thus the date when the Eleusinians were a distinct threat to the Athenians - so much so that a barrier of the proportions of our wall was necessary for protection - must have been indeed long past. This little-known work of the early Athenians is therefore proposed as the most

¹Beloch, *Griechische Geschichte*, I², 1, p. 207, note 3; A.R. Burns, *The World of Hesiod* (London, 1936), p. 196.

²This tendency to curved joints was noticed also by Skias, *op. cit.*, p. 37.

ancient known extant example of the art of fortification as practiced by the Greeks.

Peiraeus.-- A final example which may be closely dated is to be found in the Peiraeus (p. 26, A 4, 9). During the excavations undertaken during the course of the construction of a yacht club house on the spur of the Munychian hill which bounds the Munychian harbor toward the south was laid bare a short section of wall, crudely built in large unworked blocks with a tendency toward Lesbian treatment. This was originally to be seen on the northern slope of the hill, but is now almost inaccessible because of the gardens which have been planted on the slope; on the east slope a few blocks can be seen. In view of the discoveries made on the hill which indicate that the peninsula is to be identified as an important part, at least, of the region known to the ancients as the Munychia, the wall may be assigned to the fortifications of Hippias reported by Aristotle.¹

As to the other examples, they are listed together with whatever evidence for their dating has been discovered. In general it is assumed that if a town is reported to have been besieged it was protected by a wall. Unless there is good reason to the contrary, the earliest wall at a site is connected with the earliest reference, direct or indirect, to its fortifications. Thus, it is known that the Phocians took refuge in Amphissa before the advance of Xerxes.² This implies that the town was a stronghold; hence the existence of fortifications in pre-Persian times. References to walls at Amphissa earlier than this are lacking. The earliest wall found there is of Lesbian style (p. 24, A 2, 2), and must therefore have been in existence in 480 B.C. The statement that a town was conquered, of course, does not in itself prove that it was fortified, unless coupled with other evidence.

Chronological Note

A consideration of the preceding remarks, coupled with an

¹Ath. Pol., 19. 2. The wall is not mentioned by Threpsiades in the account of his work, Prak. (1935), pp. 159-195, although he indicates it on his plan. He had no opportunity to investigate this particular bit of wall, and was unwilling to commit himself.

²Herodotus, viii. 32.

examination of the following list, will show that Lesbian masonry in all its forms (excluding archaizing) is confined to the period before the Persian wars. So little is known about the sixth and preceding centuries that it is impossible to form a more accurate notion of the chronology of the development of the style. Only a very few examples can be proved to have been built before the sixth century. The majority come in the sixth century. It is possible that some of the walls for which no definite date is given are earlier than 600 B.C., but unless excavations more fortunate than usual are made, there is no evidence to prove the point. One of the good examples, an early wall at Delphi, dates probably from about 560 B.C. (p. 24, A 2, 8). Another, the lower terrace at the same place (p. 24, A 2, 7), comes about forty years later. They seem equally developed; it would be dangerous to attempt to describe the differences. The latest examples do seem somewhat irregular, but in what way, again, one would scarcely dare to say. We must be content to say that the Lesbian style flourished in the sixth century before Christ. Its origins undoubtedly lie earlier; its extinction came with the excitement of Greek feeling against the East.

LIST A.-- WALLS OF LESBIAN STYLE

A 1. Quarry Face

1.	Assos	1st of Several	....	Clark, Bacon, Koldewey, Investigations at Assos (1902), p. 213, fig. 2
2.	Athens	Acropolis (Early Gate)	Sixth Century	Wrede, pl. 20; cf. Weller, AJA, VIII (1904), p. 59
3.	Chaironeia	1st of Several	....	....
4.	Charadra	1st of 3	Sixth Century **	Burned by Xerxes (Her., viii. 33)
5.	Eleusis	Peisistratic Wall	Sixth Century	p. 15; Wrede, pl. 12
6.	Eleusis	Second Terrace	Sixth Century	Wrede, pl. 7; Noack, Eleusis, p. 23, fig. 7, pl. 20 ^a , c
7.	Fresos	Terrace	....	p. 10
8.	Larisa	1st of 3	Sixth Century	Schefold, AA, XLVIII (1933), p. 146, p. 143, fig. 2, fig. 3
9.	Melos	1st of 2	....	....
10.	Mitylene	....	....	....
11.	Samos			Wrede, AA, XLVI (1931), p. 292, figs. 36 and 37
12.	Xerokastro (Lestos)		Early Fifth Century **	pp. 10, 11

A 2. Tooled Work

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|-----|----------|---------------------------------|-------------------------|---|
| 1. | Abai | 2nd of 3 | Middle of 6th Century * | p. 17; Yorke, <u>JHS</u> , XVI (1896), p. 294; fig. 1, poor photograph |
| 2. | Amphissa | 1st of 2 | Middle of 6th Century * | p. 21 |
| 3. | Argos | 1st of Several | Middle of 6th Century * | p. 14 |
| 4. | Athens | Cistern | Middle of 6th Century | Wrede, pls. 14 and 15 |
| 5. | Athens | River Wall on Eridanos | Ca. 490 B.C. | Wrede, pl. 22 |
| 6. | Delphi | Upper Terrace | 548 B.C. | p. 16; T. Homolle, <u>Fouilles de Delphes</u> , II, 2 (1921), p. 231, fig. 185 |
| 7. | Delphi | Lower Terrace | 525 B.C. | p. 16; <u>Ibid.</u> , pp. 156 ff.; p. 166, figs. 116-124 |
| 8. | Delphi | 2nd Peribolos | 560 B.C. | p. 15; Dinsmoor, <u>BCH</u> , XXXVI (1912), p. 451 (with early gate) |
| 9. | Delphi | 3rd Peribolos | 525 B.C. | p. 15; <u>Ibid.</u> , traces in outer wall |
| 10. | Delphi | Marmaria, Second Peribolos Wall | 520-505 B.C. | p. 15; Homolle, <u>Fouilles</u> , II, 3, p. 24; II, 5, pp. 59 ff., figs. 62-4, 67 |
| 11. | Eleon | .... | .... | Frazer, <u>Commentary on Pausanias</u> , note on ix. 19. 4, <u>Harmas</u> |
| 12. | Eleusis | First Telesterion | Seventh Century | p. 14; Wrede, pl. 5; Noack, <u>Eleusis</u> , pp. 16 f., 45 f., pl. 21 a |

A 2. (Continued)

13.	Eleusis	3rd Archaic Terrace	Sixth Century	p. 14; Wrede, pl. 9; Noack, p. 23, fig. 11, pl. 20 c, d
14.	Eleusis	Peisistratic Wall	Same; later than above	p. 14; Wrede, pls. 10, 11 13; Noack, Eleusis, pp. 69 f., pls. 24 b, 27 a, c
15.	Haliartos	1st of 3	Sixth Century **	Austin, BSA, XVIII (1920/ 1921), pp. 83 f., No. 3
16.	Lamia	1st of 3	....	....
17.	Larisa	2nd of 3	Sixth Century	p. 11; Scheffold, AA, XLVIII (1933), p. 146, fig. 2
18.	Larymna	1st of 2	....	....
19.	Pharsalos	1 of Several	Sixth Century **	Stählin, Hellenistische Thessalien (Stuttgart, 1924), p. 139
20.	Pherai	1st of 2	Sixth Century **	Ibid., p. 104
21.	Rhannous	Early Temple	Ca., 510 B.C.	Wrede, pl. 18
22.	Thasos	1st of 6	Sixth Century *	p. 16; Friedrich, AM, XXXIII (1908), pp. 216 f., pl. 9, (2); Baker-Penoyre, JHS, XXIX (1909), pp. 202 f., pl. 18 b

A 3. Beveled

1.	Athens	Grave of Antidoros	330-320 B.C.	p. 13; Wrede, pl. 101
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A 4. Walls Showing Lesbian Influence

1.	Abai	1st of 3		
2.	Apotheke (Lesbos)			Koldewey, Antike Bauresten cer Insel <u>Lesbos</u> (1890), pl. 15, 3 and 4
3.	Delphi	Main Precinct (1st Peribolos)	....	p. 15; Pomtow, Kilo, VII (1907), p. 435, figs. 16, 17; Dinsmoor, BCH, XXXVI (1912), p. 451
4.	Delphi	Marmaria (Early Peribolos)	Sixth Century	p. 15; Homolle, Fouilles, II, 5, p. 37 f., figs. 45, 48, 64
5.	Eleusis	Earliest Archaic Terrace	Seventh Century	p. 14; Wrede, pl. 4; Kourouniotes, Delt., XIII (1930/31), p. 27
6.	Epáno Liosia	....	Eighth Century *	p. 18; Wrede, pls 28-29; Milchhoefer, Karten von <u>Attika</u> , text II, p. 44; map VI
7.	Eretria	1st of 6	....	p. 17
8.	Myndos	1st of Several	....	G. Guidi, Ann., IV-V, (1921/2), p. 366, fig. 26
9.	Peiræus	1st of 9	Late Sixth Century	p. 21
10.	Pharsalos	1 of Several	....	....

11. Samothrace 1st of 3

A 4. (Continued)

Sixth Century*

p. 12; Conze, Untersuchungen auf Samothrake (1875), I, pls. 5, 6, 7; Vol. II, pls. 69-70, 72; Seyrig, BCH, LI (1927), pp. 353 ff., figs. 2, 3, 6, 7

Note.-- * Dates based on historical probability, to be considered relatively certain

** Dates based on general historical background

SUMMARY

In addition to the Lesbian style, we have also to consider the Polygonal, Trapezoidal, and Ashlar styles. Below is a brief summary of the general chronology of these groups. The reader will notice that there exist examples of some of the styles which do not, according to the commonly accepted dating, conform to the suggested chronology. In most of these cases evidence has been found to revise the dating of the examples; in others exceptions must be admitted, resulting from circumstances discussed in the dissertation.

Polygonal Masonry.-- Normal polygonal work, in which the jointing produces an all-over, network effect, belongs to the middle of the fifth century, perhaps 470-420 B.C., and in its most highly developed form to about 460-430 B.C. In a modified form, in which the blocks are almost squares with the corners cut, it occurs during the period 420-390 B.C. Coursed polygonal belongs to the end of the fourth century B.C., and a little later, but its limits cannot be fixed more precisely.

Trapezoidal Masonry.-- When used consciously, irregular trapezoidal work has the same limits as normal polygonal work. Isodomic trapezoidal masonry with quarry face belongs approximately in the period 420-390 B.C. With broached face, it occurs during the period 370-335 B.C., and with pointed face, during the last third of the fourth century. Pseudo-isodomic trapezoidal work occurs as early as 314 B.C. at Stratos, but belongs properly in the third century.

Ashlar Masonry.-- Irregular ashlar masonry seems, on slight evidence, to have been most popular during the first third of the fifth century B.C. With one or two exceptions, isodomic ashlar work with quarry face belongs approximately between 425-390 B.C., but with drafted edges, excluding an archaic exception, to the Hellenistic period. Isodomic ashlar masonry with pointed, furrowed or toothed chisel work occurs once as early as 330 B.C., but is

typically a third century style. With tooled face and drafted edges, isodomic ashlar work as used in ordinary fortifications and most other walls belongs in the period 370-335 B.C.; with tooled face and beveled edges, to the period 330-290 B.C. Excepting a few archaic examples, pseudo-isodomic work, and the decorative use of headers and stretchers, belong after 330 B.C., and continue into the second century. The probable presumption is, that the more elaborate the scheme of alternation, the later the date, although this principle must be used with caution.

ILLUSTRATIONS



Fig. 1.--- Lesbian Masonry
Quarry Face
Xerokastro



Fig. 2.--- Lesbian Masonry
Tooled Face
Eleon

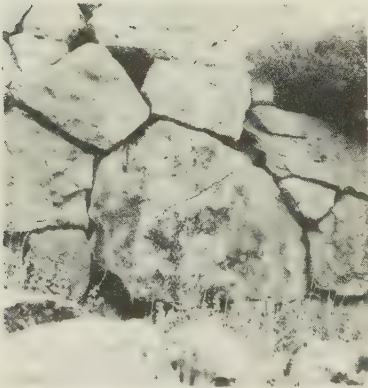


Fig. 3.--- Rubble Masonry
Lesbian Influence
Abai

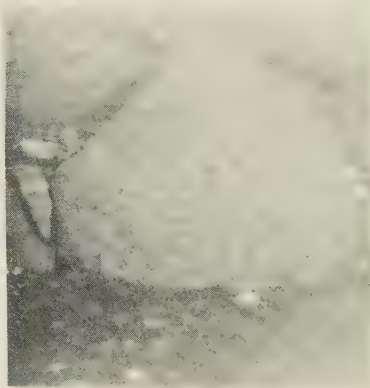


Fig. 4.--- Block from
Terrace
Eresos

